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SANITARY SCIENCE.

By DR. J. M. MCWHARF, Ottawa.

Read before the Academy, at Manhattan, November 26, 1903.

WE shall define sanitary science to be a recognition of the conditions of health, and the application of the means necessary to its protection as well as its preservation.

The principles of sanitary science are not modern in origin; in fact, they are as old as the Mosaic code, and their unerring rewards and penalties have marked the life-history of all nations of the earth; in scope they are wide enough to embrace all humanity, and just as applicable to communities of to-day as they were to the Jewish race thousands of years ago. We can say, of a truth, that the business of sanitary science begins and ends with man; its varied relations, its social forces and necessities to human life and human society end in the growth of an improved race, a healthy, useful and happy life. Every influence of food, drink, clothing, exercise, education, soil and climate come within its domain.

Good health confers on the individual, happiness, dignity, and a thousand advantages in the struggle of life; it gives to the state wealth, power, and freedom. Public health and true liberty go hand in hand; they are the companions of orderly habits and pure morals. That man is a benefactor to his race who contributes to the prolongation of human life and the enlargement of human capabilities. To fulfil this assertion, one of the first questions for consideration is health or hygiene in its various relations to society. We are surrounded by the elements of disease and dissolution; our lives are hourly in jeopardy from pernicious and destructive influences; the food that we eat and the air that we breathe are often laden with agencies to mar or destroy the harmony of our being. The infant in its mother's arms, as well as youth, with its bright hopes and gilded visions of the future, strong and vigorous manhood, with its broad sphere of usefulness and its highly cultured powers, alike pay the penalty of a violation of the laws of nature.

In the fourteenth century vice and misrule had their greatest sway in Europe. It was then that the fruits of civilization were trampled beneath the feet of the barbarian; acquisitions that had cost ages of toil and millions of money were lost in a general wreck.

When ignorance and human degradation were at the lowest ebb, then hygiene was neglected and plagues numerous rested upon the people. Extreme poverty, combined with neglect of the things nec-

essary to health and an enervated constitution, induces moral turpitude, thus preparing the way for vice and crime. In a public calamity, as the plague, cholera or yellow fever, vice and crime are always much increased, and evil passions run riot in all kinds of vicious and sinful excesses.

The wealthy and refined cannot escape with impunity when the physical and moral atmosphere is tainted; they may enjoy well-ventilated, airy apartments, with spacious grounds, isolated from the poor, with a proper observance of the laws of health, yet they cannot shield themselves from typhus, generated in the lanes and hovels of the city, nor from the darker stain, the moral contamination which is so often the outgrowth of a proximity to and familiarity with the ways of moral degradation. Greece, with the loss of her liberty, and the ruin of her cities, has an altered climate, dating back, perhaps, from the years of the Peloponnesian war, more than 400 years before the Christian era, when polished and populous Athens was devastated by fire, and sword, and plagues which completed her downfall.

In the middle of the sixteenth century London had an estimated population of 500,000, and the average duration of life was twenty-five years. Her streets were narrow, scarcely paved; imperfectly constructed sewers, as receptacles of all manner of filth; dwellings, mostly of wood, were overcrowded, and no attention was given to their ventilation; water poorly supplied, and cleanliness was neither encouraged nor enforced. In A. D. 1665, 3000 people perished from the plague in a single night. From 1665 to 1679, the mortality from that source alone reached the enormous figure of 100,000. Let us contrast that with her improved sanitation, her stupendous sewers, completed at a cost of \$20,000,000, and her population increased to millions, with the rate of mortality changed from fifty to twenty-four in 1000.

Calcutta was built in a swamp a few miles east of the river Hoogly, and surrounded by lakes whose water-supply was furnished from overflows of the river. By careful and proper drainage this city has become as healthy as any of the same latitude on earth. On the contrary, Stockholm, situated on an island at the entrance of Lake Malar, possessing all the requisite natural advantages of one of the healthiest cities in Europe, is, because of a gross disregard of sanitary laws, with imperfect drainage and bad water-supply, one of the unhealthiest in that quarter of the globe.

Sanitary science, of a necessity, must become a part of our political economy, receiving encouragement from the statesman as well as the philanthropist. We are daily made cognizant of the fact that every state in this Union must recognize the beneficial effects of sanitary laws. The tyrannical law of necessity must no longer subject the

children of the poorer classes to its relentless thraldom. Pure air, abundant light, a suitable quantity of nutritious food and cleanliness are, in a degree, denied them. They carry in their faces enduring traces of want, privation, and suffering, which have set their seal on the youthful brow. The listless face with vacant eyes speak with more emphasis than words of the fearful neglect or violation of the physical laws of nature. This does not end the evil, for the enervated body and blunted intellect become a matter of hereditary transmission. It may be truly said: "The fathers have eaten sour grapes, and the children's teeth are set on edge."

We are forced to recognize the fact that the loss of every human life from preventable disease is not only a tax upon the wealth of a state but a great sorrow to the family. It is claimed that at least one-third of all the cases of sickness and deaths that occur are preventable. What suffering, to say nothing of the continual tax on health and life, which are in direct antagonism to a general prosperity. Its ill effects are far-reaching; the tendency a deterioration of the race. Let Asiatic cholera come, smiting the young and the old, withering the pride of manhood and the beauty of youth, robbing the social circle, and the family in the garments of grief, spreading gloom and striking the panic of sudden death; then, for a time, the value of public health, and the legal statutes to protect it, will be observed; but the sacrifice has been made; you cannot retrace; you can and must submit.

How can we best subserve the welfare of the state, of the community and of the citizen in the promotion of sanitary measures? I feel certain that I have no hearers in this intellectual audience so supremely selfish that they can ask without the blush of shame, "Am I my brother's keeper?" I pity the man, I care not how high his position in society, who is unconscious of his obligations to his fellow beings; he is losing the life-giving, sanctifying influence of an approving conscience, that well-spring of moral vitality by which man is distinguished from the brute.

"That man may last, but never lives,
Who much receives, but nothing gives;
Whom none can love, whom none can thank,
Creation's blot, creation's blank."

Political economy will calculate the money value of a human life and compute the loss to society by an untimely death; hence we claim the state has a right to assume control over the factors involved in the preservation of health and the prolongation of human life.

It is an axiom that "knowledge is power." It is equally true that ignorance is power; it stalks through the land freighted with calamities; it scatters broadcast germs of disease; it leaves sickness, death

and woe in its train; it demoralizes the social, commercial and religious interests of whole communities. We therefore believe our duty to the state, to the community, to the citizen, demands an adoption of sanitary methods that will secure the greatest good to the greatest number. The principles of sanitary science should be inculcated and disseminated in the public-school system. In this intellectual nursery of humanity are contained the brightest hopes for the future of this republic. In its cradle are to be rocked the statesman, philosopher, scientist, and patriot. Physiology and hygiene are not ornamental branches of education, but essential, and should be thoroughly instilled into the minds of the children. The public schools furnish representatives from all classes and conditions of society, and they reflect in a degree the physical, mental and moral characteristics of the home. The opportunity for reaching those homes is afforded in the schoolroom through efficient teachers. By the inventive mind of the teacher every power is utilized and made subservient to the principles inculcated in sanitary science. If the people are once intelligently informed with regard to their interest in these matters, they will readily acquiesce—in fact, demand restrictive sanitary legislation.

I cannot refrain from quoting, at this point, from an address by Doctor Gihon, medical director, U. S. A.: "So long, however, as society, in its highest development of rank and culture, ignorantly jostles and wedges itself in contracted parlors and drawing-rooms, already defiled by blazing gas jets and defective furnaces, where hundreds of lavishly dressed human machines befoul the air and poison one another with the noxious gases and their own effete animal products in deadlier quantity than the ragged rabble which herd in the open street, and call this pleasure; so long as godly people drowse and yawn in badly ventilated churches, surcharging their brains and impairing their minds with blood not half aerated, and ungodly ones exhaust their whole reserve force to resist the insanitary influence of the no less badly ventilated theater and exhibition hall, and call the one pious worship and the other rational amusement; so long as men toil to amass riches and then build residences palatial, or sham palatial, and, in the name of luxury and estheticism, flood them with artificial light and heat, to consume the oxygen which prince and beggar must breathe, and admit the invisible filth by the sumptuously decorated closet and bath-room, by which they think to exclude the vile necessities of humanity, which prince and beggar alike cannot escape, and call this comfort and refinement; so long as our children are sent to overcrowded and unwholesome schools, where their eyes are bleared, their hearing dulled, their plastic bodies distorted, and their brains fuddled, and call this education; so long as men and women violate daily, in

themselves and in their children, the simplest precepts of hygiene, parents countenancing half-dressed daughters wearing out their strength in unwholesome ballrooms, seeking their slumber that cannot refresh only when dawn appears; sons launched upon the world to encounter physical wreck in a thousand channels where no beacon warns of danger; old men, senators, judges, divines, perchance learned doctors, uncomplainingly breathing the foul air of public conveyances and apartments, in which every door and window has been carefully closed and ventilation carelessly ignored; streets reeking with filth which decrepit laborers play the farce of sweeping in broad daylight—what can state medicine hope to accomplish in legislative chambers and halls of Congress, which are themselves even evidences of sanitary ignorance, sanitary neglect, and sanitary indifference?"

Universal knowledge is our only safety, as effect must follow cause. The time is not far distant when its exalted influence will compel obedience of legislators to public sentiment, and every state have a law for the protection of public health.

Moral suasion has been suggested to encourage respect for sanitary laws. More than this is required. The strong arm of the law, followed by severe penalty, will make it a success. It is gratifying that during the last decade there has been great activity along the line of the diffusion of sanitary knowledge. I trust that not far down the line in the future we may see in prophetic vision a country fair and beautiful; a heavenly country situated on this side of Jordan. A river flows through it and its waters are not polluted by the sewage of the cities of the plain; they are clear like crystal and carry nothing but health and life-giving principles to its inhabitants, being guarded upon either side by the ramparts of sanitary laws. The streets are clean and free from defilement. Its temples, palaces, institutions of learning are not of precious stones, but they are erected upon an uncontaminated soil, with perfect sanitation. From its seminaries, colleges, and universities, as well as its public schools, and, may I not add, from its halls of legislation, and the public press will come forth a flood of light and knowledge, instructing the people in the principles of sanitary science. Disease will then be prevented and life prolonged. Let us put forth every effort at our command to rid this country of all obstructions to health or anything that will abridge in the slightest degree the natural duration of man's life.

In closing, let me say, that it has been my aim to avoid specifications, as time and space would not permit going into detail, as detail here means legion.